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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,493	02/28/2002	Frederic Hoffmann	PET-1994	7475

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EXAMINER

DOROSHENK, ALEXA A

ART UNIT PAPER NUMBER

1764

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/084,493

Applicant(s)

HOFFMANN ET AL.

Examiner

Alexa A. Doroshenk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 26-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 26-47 is/are rejected.
- 7) ☒ Claim(s) 43 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02-28-02.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of group I, claims 1-14, in the paper filed October 17, 2003 is acknowledged. The traversal is moot because applicant has canceled the non-elected claims.

The requirement is still deemed proper and is therefore made FINAL.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: element 21 in figure 2. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The disclosure is objected to because of the following informalities: The specification lacks any section headings.

Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or  
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.

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- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

5. Claim 3 is objected to because it includes reference characters S1 and S2 which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

### ***Claim Objections***

6. Claim 43 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 43 recites the exact limitations of claim 14, upon which it depends.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 5, 6, 8-10, 14, 32, 39, 43 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone (4,040,794) in view of Luckenbach et al. (5,656,243).

With respect to claim 1, Stone discloses an apparatus comprising:

an elongated reaction vessel (3) comprising at least two stages (zones) in the vertical direction;

at least one catalytic reaction zone (6) per stage (zones 1-3) and extending substantially along the axis of the vessel (see figure);

means (2) for introducing at least one reaction fluid to a zone for substantially transverse fluid movement over substantially the whole vertical extent of the reaction zone (see arrows in figure);

means for introducing catalyst (50) into the reaction zone and means for extracting catalyst (53) from the reaction zone;

at least one means (60, 61) for heat exchange with the reaction fluids located between two successive reaction zones (see figure);

means for transporting reaction fluids from one stage (zone 1) to another (zone 2) connected (via 11) firstly to a heat exchange means (60) and (via 14) secondly to the reaction zone (zone 3); and

means (28) for recovering reaction fluids downstream of the last stage.

With regard to the determination of the thickness of each reaction zone and the temperature of the reaction fluids, such language does not define any structure and therefore is not given any weight to the apparatus claim. An apparatus claim covers what a device is, not what a device does. MPEP 2114.

Though Stone does disclose wherein heat exchange means are located between two successive reaction zone, Stone does not disclose wherein the heat exchange means are located inside the vessel.

Luckenbach et al. also discloses a vertical reactor and teaches that heat exchangers can be provided inside of a reactor vessel in order to efficiently exchange heat in the moving bed apparatus (col. 1, lines 51-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the heat exchange devices of Stone within the reaction vessel, according to the teaching of Luckenbach et al., in order to achieve greater heat exchange efficiency.

With respect to claim 5, since applicant has not provided a definitive structural definition of a "stage" and the broadest interpretation of the claims must be applied by the examiner, a stage has been interpreted as two adjacent reaction zones. Therefore every two adjacent reaction zones of Stone reads on a stage and since Stone discloses no limit to the number of reaction zones in the vessel (col. 5, lines 65-67), each stage (at least two) of the disclosed device has two reaction zones.

With respect to claims 6 and 32, Stone discloses wherein there are three reaction zones (see figure) and wherein there may be more (col. 5, lines 65-67).

With respect to claim 8, Stone discloses wherein the reaction zones have substantially annular cross sections (col. 3, lines 29-32).

With respect to claim 9, Stone discloses wherein the reaction zone is of an annular formation (col. 3, lines 29-32). Annular is generally equated to a circular form and since a circle is also an ellipse, Stone reads on an elliptical cross section.

With respect to claim 10, Stone discloses distribution space (15, 24) downstream of the heat exchange means (60, 61) which mixes the reaction fluids prior to introduction to the subsequent reaction zone.

With respect to claims 14, 39 and 43, Stone discloses wherein the entirety of each heat exchanger (60, 61) is disposed between two successive zones (see figure).

With respect to claim 47, the claim does not recite any further structural limitations and therefore continues to read on the apparatus as described with respect to claim 1, above. The material or article worked upon does not limit an apparatus claim. MPEP 2115.

9. Claims 2-4, 26-31, 33-35, 44 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone (4,040,794) in view of Luckenbach et al. (5,656,243), as applied to claim 1, above, and further in view of Lengemann (3,799,866).

With respect to claim 2, the modified apparatus of Stone, as discussed above, does not disclose wherein the catalyst is in fixed beds.

Lengemann also discloses an elongated vertical reaction vessel with a moving bed and teaches valves (4 and 13) at the catalyst introduction and extraction means in



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order to control the flow of fresh catalyst to the system as well as control the removal of deactivated catalyst from the system (col. 2, lines 5-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide valves at the same points in the device of Stone in order to control the movement of catalyst in and out of the vessel.

With such a modification, one would be capable of ceasing the catalyst flow and thereby generate a catalyst of a fixed bed formation.

With respect to claim 3, the modified apparatus of Stone, as discussed above, including wherein in the catalyst bed is a moving bed of gravitational flow (col. 7, lines 35-36), but does not disclose having the reaction zones being connected by a passage of reduced cross section to the reaction zones nor means for adjusting and controlling the rate of catalyst flow in the catalyst introducing (50) and extraction (53) means.

Lengemann also discloses an elongated vertical reaction vessel with a moving bed. Lengemann discloses wherein passages (9) for catalyst from vertical catalyst zone to the next are of a smaller diameter than the catalyst channel to prevent the reactants from flowing upward through the catalyst (col. 2, lines 41-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide passages of smaller diameter between reaction zones for the catalyst of Stone in order to prevent the reactants from flowing back upward through the catalyst, as taught by Lengemann.

Lengemann also teaches valves (4 and 13) at the catalyst introduction and extraction means in order to control the flow of fresh catalyst to the system as well as

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control the removal of deactivated catalyst from the system (col. 2, lines 5-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide valves at the same points in the device of Stone in order to control the movement of catalyst in and out of the vessel.

With respect to claim 4, Stone discloses wherein the catalyst and reaction fluids move generally co-current (see arrows of figure).

With respect to claim 26-28, since applicant has not provided a definitive structural definition of a "stage" and the broadest interpretation of the claims must be applied by the examiner, a stage has been interpreted as two adjacent reaction zones. Therefore every two adjacent reaction zones of Stone reads on a stage and since Stone discloses no limit to the number of reaction zones in the vessel (col. 5, lines 65-67), each stage (at least two) of the disclosed device has two reaction zones.

With respect to claims 29-31, Stone discloses wherein there are three reaction zones (see figure) and wherein there may be more (col. 5, lines 65-67).

With respect to claims 33-35, Stone discloses distribution space (15, 24) downstream of the heat exchange means (60, 61) which mixes the reaction fluids prior to introduction to the subsequent reaction zone.

With respect to claim 44, Stone discloses wherein means for transporting reaction fluids from stage to stage are disposed in the proximity of the central axis of the vessel (4, 17, 25).

With respect to claim 46, Stone discloses wherein the entirety of each heat exchanger (60, 61) is disposed between two successive zones (see figure).

10. Claims 13, 36 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone (4,040,794) in view of Luckenbach et al. (5,656,243), as applied to claim 1, above, and further in view of Kröger (5,623,989).

With respect to claims 13 and 36, Stone discloses the required heat exchangers, but only generally. Stone does not express any specific heat exchanger for the device.

Kröger teaches a finned tube heat exchanger and discussed that it has the advantage of not increasing pressure loss. Since Stone teaches a pressure tight vessel (col. 3, lines 41-42), it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the specific heat exchanger of Kröger as the heat exchanger of Stone in order to provide a heat exchange which will ensure that the pressure of the vessel is maintained.

With respect to claim 42, Stone discloses wherein the entirety of each heat exchanger (60, 61) is disposed between two successive zones (see figure).

11. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone (4,040,794) in view of Luckenbach et al. (5,656,243), as applied to claim 1, above, further in view of Lengemann (3,799,866), as applied to claim 3, and further in view of Kröger (5,623,989).

With respect to claim 45, Stone discloses the required heat exchangers, but only generally. Stone does not express any specific heat exchanger for the device.

Kröger teaches a finned tube heat exchanger and discussed that it has the advantage of not increasing pressure loss. Since Stone teaches a pressure tight vessel (col. 3, lines 41-42), it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the specific heat exchanger of Kröger as the heat exchanger of Stone in order to provide a heat exchange which will ensure that the pressure of the vessel is maintained.

12. Claims 1, 2, 5-7, 11, 12, 14, 26, 29, 32, 40, 41 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Albano et al. (4,423,022) in view of Lengemann (3,799,866).

With respect to claims 1 and 2, Albano et al. discloses an apparatus comprising:  
an elongated reaction vessel comprising at least two stages in the vertical direction (col. 3, lines 40-42);

at least one catalytic reaction zone per stage (col. 3, lines 36-58) and extending substantially along the axis of the vessel (see figures);

means (1) for introducing at least one reaction fluid to a zone for substantially transverse fluid movement over substantially the whole vertical extent of the reaction zone (see arrows in figures);

at least one means (6, 7) for heat exchange with the reaction fluids located between two successive reaction zones and inside the vessel (see figures and col. 3, lines 46-47); and

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means for transporting reaction fluids from one stage to another connected firstly to a heat exchange means and secondly to the reaction zone (see arrows in figures); and means (18) for recovering reaction fluids downstream of the last stage.

Albano et al. does not disclose how the catalyst is introduced or removed from the apparatus.

Lengemann also discloses an elongated vertical reaction vessel with a catalyst bed and teaches valves (4 and 13) for catalyst introduction and extraction means in order to control the flow of fresh catalyst to the system as well as control the removal of deactivated catalyst from the system (col. 2, lines 5-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide valves at the same points in the device of Albano et al. in order to control the movement of catalyst in and out of the vessel.

With such a modification, one would be capable of ceasing the catalyst flow and thereby generate a catalyst of a fixed bed formation.

With regard to the determination of the thickness of each reaction zone and the temperature of the reaction fluids, such language does not define any structure and therefore is not given any weight to the apparatus claim. An apparatus claim covers what a device is, not what a device does. MPEP 2114.

With respect to claim 7, it can be seen in figure 3 of Albano et al. that the reaction zones are of a substantially planar cross section.

With respect to claim 11, Albano et al. discloses wherein the means (13) for transporting reaction fluids from one stage (11) to the lower stage (14, 17) is disposed substantially in the proximity of the central axis of the vessel.

With respect to claim 12, Albano et al. discloses a means (at 21 in the embodiment of figure 7) at the center of at least one stage which separates the reaction fluids into a plurality of streams which traverse through reaction zones and heat exchangers within that stage.

With respect to claims 5 and 26, Albano et al. discloses at least two stages (11, 14) and at least two reaction zone per stage (see figure 3).

With respect to claims 6, 29 and 32, Albano et al. discloses wherein there are three to twelve reaction stages (see fig. 4 and 6).

With respect to claims 14, 40, 41 and 43, Albano et al. illustrates wherein at least a portion of a heat exchange means is disposed between two successive stages (see figures).

13. Claims 13, 37, 38, 42 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Albano et al. (4,423,022) in view of Lengemann (3,799,866), as applied to claims 11 and 12 above, and further in view of Kröger (5,623,989).

With respect to claims 13, 37 and 38, Albano et al. discloses the required heat exchangers, but does not disclose a finned tube heat exchanger.

Kröger teaches a finned tube heat exchanger and discussed that it has the advantage of not increasing pressure loss. Since Albano et al. teaches a pressure tight

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vessel (col. 3, lines 40-42), it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the specific heat exchanger of Kröger as the heat exchanger of Albano et al. in order to provide a heat exchange which will ensure that the pressure of the vessel is maintained.

With respect to claim 42, Albano et al. illustrates wherein at least a portion of a heat exchange means is disposed between two successive stages (see figures).

With respect to claim 47, the claim does not recite any further structural limitations and therefore continues to read on the apparatus as described with respect to claim 1, above. The material or article worked upon does not limit an apparatus claim. MPEP 2115.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexa A. Doroshenk whose telephone number is 571-272-1446. The examiner can normally be reached on Monday - Thursday from 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alexa Doroshenk  
Patent Examiner  
Art Unit 1764

March 4, 2004